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मानक

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“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 6973 (1973): Precision Angle Plates [PGD 25: Engineering Metrology]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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Indian Standard
SPECIFICATION FOR
PRECISION ANGLE PLATES

1. Scope — Covers requirements for precision angle plates.

2. Nomenclature and Definitions — The nomenclature given in Fig. 1 along with the definitions given in 2.1 to 2.4 shall apply.

2.1 Working Faces — The term applies to external faces, end faces and longitudinal edges (see Fig. 1).

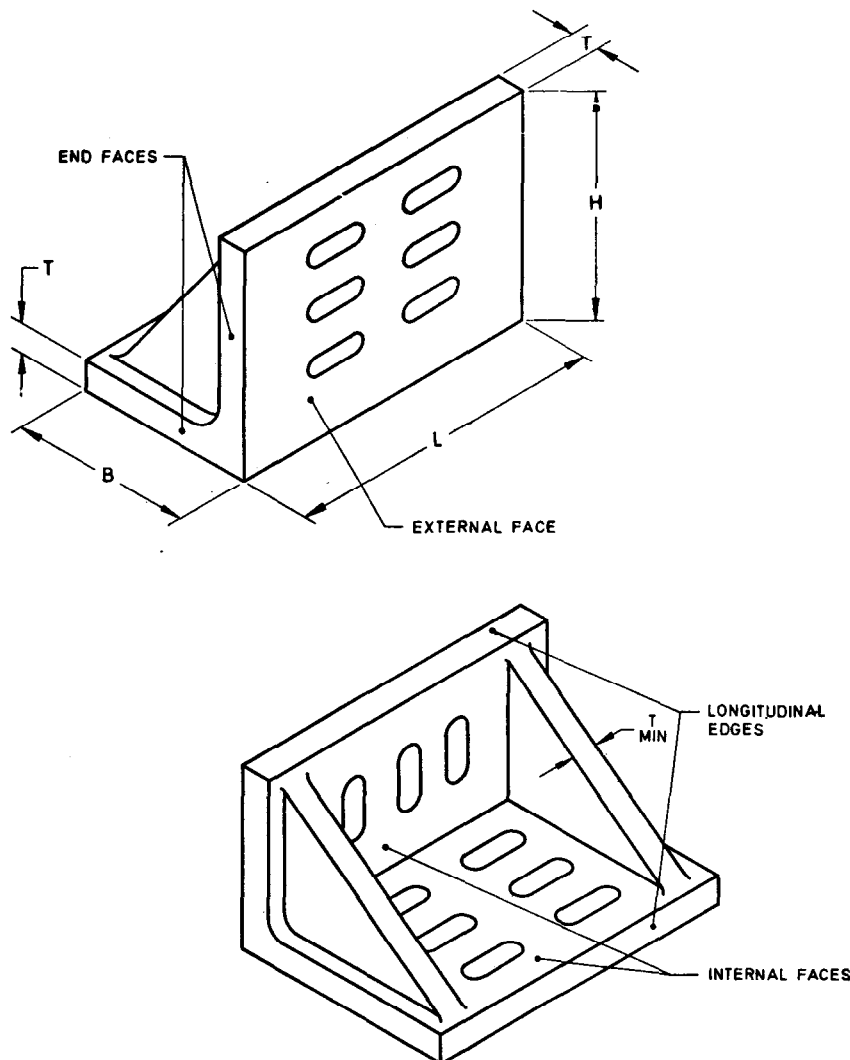


FIG. 1 PRECISION ANGLE PLATE

2.2 Tolerance on Flatness — The maximum permissible distance between two imaginary parallel planes within which the surface under consideration can just be enclosed (see Fig. 2).

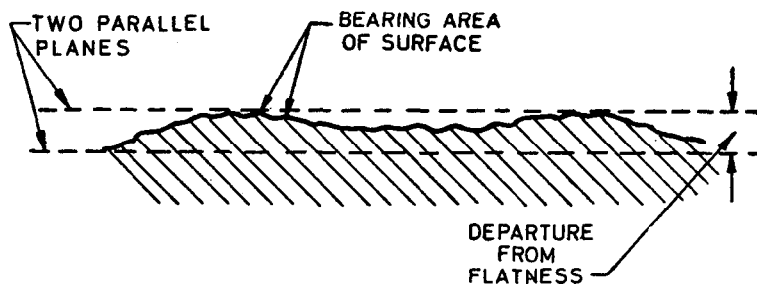


FIG. 2 EXAGGERATED ILLUSTRATION OF FLATNESS TOLERANCE

2.3 Tolerance on Squareness—The maximum permissible distance between two imaginary parallel planes within which one of the surfaces under consideration can just be enclosed, when the other surface is perpendicular to the imaginary parallel planes. The squareness tolerance is expressed over the length *L* of one of the surfaces (see Fig. 3).

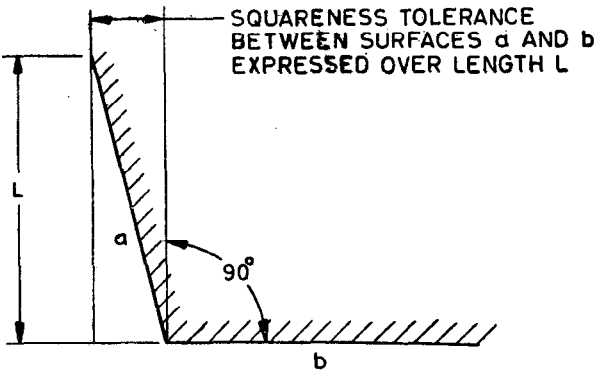


FIG. 3 EXAGGERATED ILLUSTRATION OF SQUARENESS TOLERANCE

2.4 Tolerance on Parallelism—The maximum permissible distance between two imaginary parallel planes within which the surface under consideration can just be enclosed. The two imaginary parallel planes are parallel to the datum plane in question (see Fig. 4).

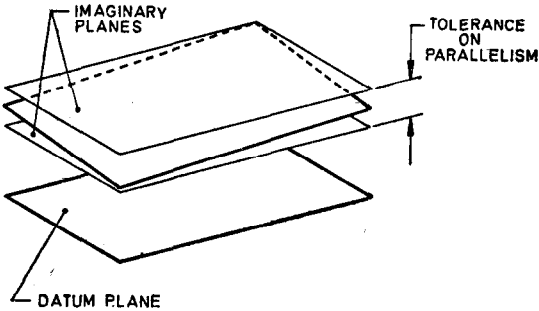


FIG. 4 EXAGGERATED ILLUSTRATION OF PARALLELISM TOLERANCE

3. Recommended General Dimensions

- 3.1** The dimensions of precision angle plates shall be as given in Table 1. When precision angle plates of intermediate sizes are required, these shall be made to the tolerances as those for the next smaller standard size.
- 3.2** The precision angle plates shall be webbed on their internal faces and shall have the minimum thickness *T* as specified in Table 1. It is recommended that the webs be set in from the ends of the plates in such a way as to give sufficient space for clamping parallel clamps during inspection.
- 3.3** Where T-slots are provided, they shall comply with IS : 2013-1962 'Dimensions for T-slots' and the thickness shall be increased proportionately.

TABLE 1 RECOMMENDED GENERAL DIMENSIONS FOR PRECISION ANGLE PLATES WITHOUT T-SLOTS

(Clauses 3.1 and 3.2, and Fig. 1)
All dimensions in millimetres.

Size No.	<i>L</i>	<i>B</i>	<i>H</i>	<i>T, Min</i>
1	125	75	100	13
2	175	100	125	16
3	250	150	175	22
4	350	200	250	29
5	450	300	350	32
6	600	400	450	35

4. Material and Hardness — The precision angle plates shall be made from close-grained cast iron conforming to Grade 20 or higher of IS : 210-1970 'Specification for grey iron castings (second revision)'. The castings shall be sound, free from blow holes and porous patches. The plates may also be made from good quality steel. The plates shall be suitably heat-treated and stabilized. The precision angle plates made from cast iron shall have a minimum hardness of 180 HB, and those made from steel shall have a minimum hardness of 600 HV.

5. Finish — All the working faces of precision angle plates shall be finished by lapping, fine grinding, or scraping. When finished by grinding or scraping, these shall have an area of high spots not less than 20 percent. The method for determining bearing area is given in Appendix A. Other surfaces shall have a smooth finish and shall preferably be painted. All sharp edges shall be removed. Finished surfaces should be free from dents, corrosion marks, etc.

6. Accuracies — The accuracies of precision angle plates shall be as specified in Table 2.

TABLE 2 ACCURACIES FOR PRECISION ANGLE PLATES

All dimensions in millimetres.

Size No.	Flatness of Working Faces	Squareness of External Faces Over Dimension H	Parallelism Between the Two End Faces and Between Longitudinal Edges and the Corresponding External Faces	Squareness of End Faces with External Faces Over Total Length L
1	0.001 5	0.004	0.004	0.004
2	0.002 5	0.005	0.005	0.005
3	0.003	0.007 0	0.008	0.008
4	0.004	0.007 5	0.010	0.010
5	0.005	0.008	0.010	0.010
6	0.006	0.010	0.012	0.012

7. Designation — The designation of precision angle plates shall consist of its size number and the number of this standard.

Example:

A size 2 precision angle plate shall be designated as:

Precision Angle Plate 2 — IS : 6973

7.1 In case of precision angle plates provided with T-slots, the word 'with T-slots' is to be added after the designation.

Example:

A size 5 precision angle plate with T-slots shall be designated as:

Precision Angle Plate 5 — IS : 6973 with T-slots

8. Marking — Each precision angle plate shall be legibly and permanently marked with the size and the manufacturer's name or trade-mark. The marking shall be such that it does not affect the accuracy of the plate.

8.1 ISI Certification Marking — Details available with the Indian Standards Institution, New Delhi 110001.

9. Packing — Each precision angle plate shall be packed in a strong protective case. During storage and transit all the finished surfaces and edges of plates shall be protected against the climatic conditions by covering with a suitable corrosion preventive preparation.

APPENDIX A

(Clause 5)

DETERMINATION OF THE PROPORTION OF BEARING AREA

A-1. In order to determine the proportion of the bearing area of a scraped plate, its surface is first blued and rubbed with another plate so that the small bearing areas are brought up clearly into view. A small

glass plate* on which an area of 50×50 mm has been ruled into 400 smaller squares (2.5×2.5 mm)† is then placed upon the surface. Each small square is then observed in turn and a note made of the estimated fraction of its area (in tenths) which is occupied by a high spot on the surface.

A-2. The addition of all these fractions when divided by four gives the percentage of the bearing area of the surface over the region tested. The test may be repeated at other positions on the surface in order to obtain a fair average figure.

A-3. It may be mentioned that after testing a few plates by this method the results obtained coupled with the general appearance of the bearing areas enable a fairly close estimate to be made of the proportion of bearing area of a plate merely from its general appearance.

*These glass plates can readily be produced like lantern slide by photographing a chart drawn on the paper.

†The exact size of the square is unimportant provided that all the squares are of the same size.